



IOT BASED SMART BUS TRACKING AND TICKETING SYSTEM

Dr V Subedha¹, G Antony², V Arunkumar³, A Venkatachalam⁴

Professor¹, UG Scholars^{2,3,4}

Department of Computer Science and Engineering

Panimalar Institute of Technology, Chennai, Tamil Nadu, India

subedha@gmail.com¹, antonygeorge1506@gmail.com², randyak287@gmail.com³,

venkatarjun1051@gmail.com⁴

ABSTRACT

It is the system to make the bus transportation system in a way of smart and better way, because today's entire becomes the smart and secured. Because of every one communication happened via the internet and also the smart communication system. In proposed system, we are using the IOT and also the smart communication based on the Radio frequency. Here, will check the bus availability, root of that bus and near availability, timing for arrival and the smart ticket money transaction everything done by using the IOT.

RELATED WORK

The main aim of the project is to tracking and ticketing the bus by using Raspberry Pi and Arduino. Raspberry Pi board is a fully functional computer or full-fledged credit card sized. It has all the trappings of a computer, with a dedicated memory, processor, and a graphics card for output through HDMI. The main purpose of the Arduino board is to interface with the devices and sensors, so it's great for hardware projects in which you simply want things to respond various sensor readings and manual input. This may not seem to be a lot, but it is actually a very sophisticated system that allows you to better manage your devices.

LITERATURE SURVEY:

S.NO	TITLE	ISSUED	ADVANTAGES	DISADVANTAGES	TECHNIQUES USED
1	Real Time Bus monitoring and Passenger Information System.	International Journal of Soft Computing and Engineering (IJSCE)", ISSN:2231-2307, Volume-1, Issue-6, January 2012 34	This system is used to track the locations of buses in real time and uses this information to generate predictions of bus arrivals at stops along the route. When this information is disseminated to passengers by wired or wireless media.	The day progresses, such as traffic congestion, unexpected delays, randomness in passenger demand, irregular vehicle-dispatching times, and incidents.	RTPIS rolling display on bus stops – expected time of arrival in real time. Web based interface for control room to monitor buses in real time. Mobile application for end user to find out bus schedules and RTPIS.
2	SMS based Bus Tracking System using Open Source Technologies	International Journal of Computer Applications (0975 – 8887) “, Volume 86 – No 9, January 2014	This system has the facility for informing the change of route & cancellations to registered users and can resolve following problems such as late arrivals, improper use of vehicles, unsafe driving habits.	Most of the tracking systems use geographic position and time information from the global positioning satellites. GSM(Global system of Mobile Communications) and GPS(Global Positioning System) the accuracy Is not up to the level.	It uses the satellite technology and advanced computer modeling to track vehicles on their routes. The system is implemented using a WAMP server and an application to track the bus is written in PHP with MYSQL as a database for storing the necessary details.
3	Design and Implementation of Web-Based GPS-GPRS Vehicle Tracking System	International Journal of Computer Science and Information Technologies , Vol 3, Issue 12, 443-448, December 2013.	Transmission cost extremely reduced by using GPRS service instead of SMS. Google Map free service and the use of HTTP protocol as a data sending method reduces the monthly cost for an individual user or an enterprise	The Designed system displays locations of the tracked vehicle with an error between 2.5 and 50 meter in real-time on the map. Accuracy of the system is highly dependent on the GPS device and the coordinates received from GPS satellite while reliability and usability depend on the reliability of the mobile communications network.	General Packet Radio Service GPRS is a packet switched service based on Global System for Mobile Communications GSM, an extensively deployed voice technology.

4	Predicting Transit Vehicle Arrival Times	Geo Graphics Laboratory, Bridgewater State Colleague, Bridgewater, Mass., 2001.	A critical issue encountered in implementing GPS control is to predict the time it takes for a transit vehicle to arrive at the next signalized intersection if the current distance from the intersection is known.	there are still difficulties in provision of accurate real-time travel time information on signalized urban streets because of the stochastic nature of urban traffic. This is even worse in developing countries considering the undisciplined traffic everywhere and lack of collected data.	The research used GPS data which is quite a new data collection scheme in the area and an algorithm based on an artificial neural network (ANN).
5	GPS Based Low Cost Intelligent Vehicle Tracking System (IVTS)	International Conference on Traffic and Transportation Engineering (ICTTE 2012) IPCSIT vol. 26 (2012) © (2012) IACSIT Press, Singapore	The low cost IVTS combined with available high performance processors can provide a highly accurate yet inexpensive vehicle tracking and navigation solution which is the need of the hour in fast moving urban cities of India.	There is a problem in which tracking of GPS in case of rural areas tracking is not up to the level because of the satellite coverage.	The technique used is describes a low cost intelligent vehicle tracking system based on NAVSTAR GPS, a radio navigation system by USA Department of Defense (DOD).
6	PREDICTION OF BUS TRAVEL TIME USING ARTIFICIAL NEURAL NETWORK	Centre for Transportation System, Indian Institute of Technology Roorkee, Roorkee 247667, Uttarakhand, India	Providing reliable and accurate bus travel and arrival times would be an effective way to improve the service of bus transit systems	Several bus routes share the same road segments and bus stops.	automatic vehicle location (AVL), automatic vehicle identification (AVI) systems, automatic passenger counters (APC)
7	Real Time Web Based Bus Tracking System	International Research Journal of Engineering and Technology (IRJET), feb 2016	Many organizations and individuals find a need for tracking nowadays for safety. Logistics companies need to track vehicles when precious cargos are carried. Individuals track and monitor their vehicles as a concern for safety. Public transport vehicles are tracked nowadays to provide citizens with transportation details.	The cost effectiveness and its implementation have become high. The problem lies in maintaining high grade servers to backup the data for vehicle tracking and the use of internet to track these vehicles.	SMS (Short Message Service). GPS (Global Positioning System) and GSM (Global System for Mobile communication)

8	Intelligent Bus Monitoring and Management System	Proceedings of the World Congress on Engineering and Computer Science 2012 vol II WCECS 2012, October 24-26, 2012, San Francisco, USA	The processed data is saved in the database before the data can be shown to the end-user. The information in the database includes the bus ID, time and date of tagging, and the last station tagged. Whether the bus is early, on time, or late, all these statuses can be observed and distinguished by color. Red indicates that the bus is behind schedule, pink indicates that the bus is too early, and green indicates that the bus is on time.	Vehicle tracking, monitoring and alerting system is challenging problem.	RFID and sensing technologies
9	A real-time computer vision system for vehicle tracking and trace • surveillance	University of California, Berkeley, CA, 94720, USA Department of Electrical Engineering and Computer Sciences, University of California, Berkeley, CA 94720-1776, USA	The resulting vehicle trajectories can be used to provide traditional traffic parameters as well as new metrics such as lane changes. The quest for better traffic information, and thus, an increasing reliance on traffic surveillance, has resulted in a need for better vehicle detection such as wide-area detectors; while the high costs and safety risks associated with lane closures has directed the search towards non-invasive detectors mounted beyond the edge of the pavement.	The camera-based system is only able to detect, track, and identify the type vehicles on the roadway.	Global Positioning system (GPS), VECTOR system.

10	A Smart Bus Tracking System Based on Location Aware Services and QR Codes .	IEEE International Symposium on Innovations in Intelligent and Applications Proceedings, pp: 299-309, 2014.	The proposed system, basically tracks the busses, estimates their arrival times at specific bus stops and informs the users through prevents passengers unnecessarily to wait at bus stops and enables them to use their time more efficiently.	When QR codes, which are placed at bus stops, The passengers can't scan the QR code at a time.	It is based on GPS, GSM, QR coding and Google's map technologies.
11	Experimental Study on Real Time Bus Arrival Time Prediction with GPS Data	Center for Transportation Research and Department of Civil and Environmental Engineering 200 Patton Hall Virginia Polytechnic Institute & State University Blacksburg, VA 24061.	The system that are developed is compatible with both GPS and DGPS, that have used it for regular GPS units. The average length of a link is currently 20 meters. Links with longer length could reduce the total number of links needed to represent a route and thus reduce the overall computational time.	GPS data are available to us approximately every 45 seconds. That will further examine if the performance of an algorithm will degrade significantly when the sample period increases.	Traffic signal preemption (TSP), and Advanced Traveler Information Systems (ATIS).
12	Real Time Bus Monitoring System by Sharing the Location Using Google Cloud Server Messaging.	International Journal of Innovative Research in Computer and Communication Engineering An ISO 3297: 2007 Certified Organization Vol.3, Special Issue 8, October 2015.	This research serves the needs of user, vehicle drivers and administrators of the transport system. The real time arrival information of buses at bus stops will be provided in the form of application.	This algorithm works by recording the time it takes to traverse each link. Predictions are only based on the present and past observations of a bus passing through each link.	Link updater, which estimates the travel time for each Link ETA calculator, which calculates the ETA for every bus stop.
13	Bus Travel Time Prediction Model for Dynamic Operations Control and Passenger Information Systems	Ali Farhan, M.A.Sc. Graduate Student, Department of Civil Engineering University of Toronto 35 St. George Street Toronto, Ontario, Canada M5S 1A4	Prediction accuracy and robustness were used as performance measures.	This kind of travel time information may be less important as it is within an acceptable range of waiting time.	An algorithm based on an artificial neural network using GPS data for predicting the travel time of transit vehicles.

14	Using scats data to predict bus travel time.	Ehsan Mazloumi, Graham Currie, Geoff Rose, and Majid Sarvi Institute of Transport Studies, Monash University, Melbourne, Australia.	Arrival time information also Benefits passengers by helping them efficiently schedule their departure times, and successfully make transfers at transit stations.	The algorithm was primarily developed for only rural areas where traffic congestion is Minimal or does not exist.	Advanced Public Transportation Systems (APTS) such as Global Position Systems (GPS), Automatic Vehicle Location (AVL) and Automatic Passenger Counting (APC) systems.
15	R-Indicator: The Bus Tracking System.	IOSR of Computer Engineering .ISSN: 2278-0661,p-ISSN: 2278-8727 PP 50-51.	The main advantage of the system is that it neither requires a GPS nor an internet connection. The user has to simply send a SMS from his mobile phone in a specified format to a standard toll-free number and the system would be in return sending the user with current location of the bus, vacant seats in the bus, its expected arrival time, etc.	In case of offline users they can see only bus schedule cannot track a bus.	GPS, Google Map, Dijkstra's Shortest Path Algorithm (DSPA).

CONCLUSION

Thus, it presents a state-of-the-art of raspberry Pi and arduino is used to track and ticket the bus transportation system easier. By the combination of these devices it is easy to track the bus with a alert message. This system will be useful for all the passengers to board the bus by knowing the location of the bus through SMS. This can help the users to get into the less crowded bus in the same route. From this survey, it is evident that the accuracy of the bus tracking system will increase.

FUTURE WORK

For future work, we plan to investigate how to generate better performance. We will also try to apply new technologies to create a efficient system.

REFERENCES

- [1] Google maps, <https://developers.google.com/maps/>
- [2] Chheda Gaurav, Gajra Niket, Chhaya Manal, Deshpande Jitesh, Gharge Saylee, "Real Time Bus monitoring and Passenger Information System", in "International Journal of Soft Computing and Engineering (IJSCE)", ISSN:2231-2307, Volume-1, Issue-6, January 2012 34.
- [3] Maruthi R., Jayakumari C., "SMS based Bus Tracking System using OpenSource Technologies", in International Journal of Computer Applications (0975 – 8887) " , Volume 86 – No 9, January 2014.
- [4] Salim A., Idrees Ibrahim , "Design and Implementation of Web-Based GPS-GPRS Vehicle Tracking System", in International Journal of Computer Science and Information Technologies , Vol 3, Issue 12, 443-448, December 2013.
- [5] Vasileios Karagiannis, Periklis Chatzimisios, Francisco Vazquez-Gallego and Jesus Alonso-Zarate, "A Survey on Application Layer Protocols for the Internet of Things", Transaction on IoT and Cloud computing, 2015.
- [6] Z. Wei, Y. Song, H. Liu, Y. Sheng and X. Wang, "The research and implementation of GPS intelligent transmission strategy based on on-board Android smartphones," *Computer Science and Network Technology (ICCSNT), 2013 3rd International Conference on*, Dalian, 2013, pp. 1230-1233.
- [7] Y. Chen and T. Kunz, "Performance evaluation of IoT protocols under a constrained wireless access network," *2016 International Conference on Selected Topics in Mobile & Wireless Networking (MoWNeT)*, Cairo, 2016, pp. 1-7.
- [8] MongoDB, <https://docs.mongodb.com/>
- [9] MQTT , <http://mqtt.org/documentation>, mqtt.org
- [10] K. Tanaka and K. Naito, "Demo: Implementation of unconscious bus location sensing system with smartphone devices and beacon devices," *2016 13th IEEE Annual Consumer Communications & Networking Conference (CCNC)*, Las Vegas, NV, 2016, pp. 280-281.
- [11] HAProxy, <http://www.haproxy.org/>
- [12] J. Gong, M. Liu and S. Zhang, "Hybrid dynamic prediction model of bus arrival time based on weighted of historical and real-time GPS data," *2013 25th Chinese Control and Decision Conference (CCDC)*, Guiyang, 2013, pp. 972-976.

- [13] L. Singla and P. Bhatia, "GPS based bus tracking system," *Computer, Communication and Control (IC4)*, 2015 International Conference on, Indore, 2015, pp. 1-6.
- [14] Ahmed N.Abdalla, Azher Fakharuddin, Muhammad Rauf and NikM.Kamal , "Design of Intelligent GPS Navigation System for Bus Monitoring and Station Reporting", National Conference on Postgraduate Research, 2009.
- [15] EMQTT, <http://emqtt.io/docs/v2/index.html> 109.